

**REMARKS**Summary Of The Office Action

Claims 20-38 pending.

Claims 20, 22 and 23 have been rejected under 35 U.S.C. § 102(b) as anticipated by Barton U.S. Patent No. 4,644,877 (“Barton”) or alternatively under 35 U.S.C. § 103(a) as obvious from Barton. Claims 20-31 and 36-38 have been rejected under 35 U.S.C. § 103(a) as obvious from Barton in view of Carr et al. U.S. Patent No. 5,011,520 (“Carr”). Claims 32-35 have been rejected under 35 U.S.C. § 103(a) as obvious from Barton and Carr in view of Wofford et al. U.S. Patent No. 5,011,520 (“Wofford”).

Applicants’ Reply

Claims 20-38 have been amended for clarity. Applicants’ respectfully traverse the prior art rejections,

Applicants’ invention relates emission control systems and methods for removing toxic byproducts of industrial processes. In particular, applicants have invented a system for removing toxic materials by plasma processing of industrial waste gases. Applicant’s waste gas cleaning system, according to claim 20, is a combination of a reaction chamber, a plasma source for generating a plasma in the reaction chamber, and a liquid jet pump in an outlet of the reaction chamber (i.e. at a downstream location). The liquid jet pump draws the waste gases through the reaction chamber for processing. The liquid jet pump, which relies on known physical phenomena such as the Venturi effect to generate negative pressures to draw waste gases through the reaction chamber, is arranged at an outlet of the reaction chamber. The liquid jet is arranged

at so that processed gases exiting an outlet of the reaction chamber are mixed with the liquid of liquid jet.

Independent claim 20

Independent claim 20 has been rejected as anticipated or obvious from Barton (Office Action Section 1) and as obvious from Barton and Carr (Office Action Section 2). Applicants respectfully submit that the cited prior art does not show, teach or suggest the waste cleaning system of claim 20.

Barton rejection

As the Examiner correctly notes, Barton describes a waste gas cleaning system which includes a reaction chamber for plasma processing of the waste gases. (See Office Action Section 1). However, unlike Applicants' liquid jet pumping arrangement that creates low pressures to draw gas through the reaction chamber, Barton describes only mechanical pumping means (e.g., induction/suction fan 20, variable speed waste feed pump 74, etc.) for moving waste gases and products. Further, the Examiner has correctly noted Barton describes use of spray nozzles 94 to supply water or alkaline solution for quenching waste gas or waste gas products. Barton's spray nozzles 94 atomize the quenching liquid to form a uniform spray of micron sized droplets to quench the product gas and particulate matter. (See e.g., col. 5, lines 15- 30). However, there is nothing in Barton to show, teach or suggest use of water jets to induce "suction" and in particular, enough suction to draw waste gases through the reaction chamber.

Applicants note that Barton's radial arrangement of water jets on a spray ring ( See e.g., FIG. 1) is selected with a view to distribute the quenching liquid evenly. The radial arrangement of inward jets does not lead to "generation of low pressures" (e.g., by the Venturi effect utilized by applicants) to draw gases from the reaction chamber. As the Examiner himself notes "that the

suction of the induction fan 20 creates a negative pressure on the scrubber and the reaction chamber, which imposes a negative pressure on the liquid jet". (See Office Action, 3rd from last sentence in Section 1, and also Barton Col. 10 lines 26-31).

Accordingly, Barton does not in any manner anticipate or render obvious applicants' inventive use of liquid jets as pumping means in conjunction with plasma reaction chambers for treating waste gases. Therefore, claim 20 is patentable over Barton.

Barton and Carr rejection

Applicants' respectfully submit that the combination of the cited references lacks proper motivation. Further, even if the references were improperly combined, they do not show teach or suggest the elements of claim 20. In particular they do does not show teach or suggest employing liquid jet pumps in conjunction with a plasma processing reaction chamber. As described above, Barton does not show teach or suggest employing liquid jet pumps to draw gases through a plasma processing reaction chamber.

Further unlike applicant' system or Barton's system, Carr is not concerned with concerned plasma processing reaction or treatment chambers. Carr merely describes a hydrodynamic fume scrubber, i.e. a water scrubber. (See e.g., FIGS 1-10). Carr does not show, teach or suggest any mechanism for pumping or drawing gas through a plasma reaction chamber.

Carr's fume scrubber includes several stages (e.g., an inlet stage 18, and a negative pressure providing stage 20 which is upstream of a main chamber 22). (See e.g., col. 6 line 28 - col. 7 lines line 4, FIG. 5 and 6, etc.). As noted by the Examiner, Carr uses a nozzle to direct scrubbing liquid to increase recirculation stream velocity to promote mixing of incoming gas effluent in the inlet section before the main chamber. (See Office Action section 2 citing Carr col. 3 line 65 - col. 4 line 2). Applicants note that Carr's negative pressure providing stage.

which is located at the inlet or upstream of the main chamber 22, creates only limited negative pressure to push premixed gaseous effluent into main chamber 22 and not across or through the main chamber 22. (See e.g. col. 8 lines 14-43 and FIG. 5).

Applicants' also note that Carr's apparatus configuration, which has the negative pressure providing stage located at the inlet, will be unworkable in plasma processing arrangements because of the physical and chemical nature of plasma processes. Plasma processes are "dry" gas processes and will not tolerate any mixture of water or liquids in the reaction chamber. Thus, a person of ordinary skill in the art would not apply Carr's inlet configuration to a plasma reaction chamber to draw "dry" process gasses into the reaction chamber.

Thus, Carr like Barton does not to show, teach or suggest using a liquid jet arrangement located at the outlet of a plasma reaction chamber to draw waste gases through the reaction chamber. Therefore, claim 20 is patentable over Barton and Carr, whether viewed individually or in combination.

Applicants also note that claim 20 is also patentable over the third cited reference - Wofford, whether it is viewed in isolation or in combination with the other two cited references. Wofford describes a "cold" non-thermal plasma process for dictation of gaseous halogenated hydrocarbons and other persistent organic compounds. Wofford, like Barton mentions only conventional mechanical pumping mechanisms (e.g. Fig. 1 suction pump 2) for moving waste gas through a plasma reaction chamber and is not relevant to the issue of liquid jet pumping arrangements.

#### Dependent claims 21-38

Dependent claims 21-38 are patentable over the cited references for at least the same reasons that parent claim 20 is patentable over these references.

Conclusion

Applicants respectfully submit that this application is now in condition for allowance.

Reconsideration and prompt allowance of which are requested.

If there are any remaining issues to be resolved, applicant respectfully requests that the Examiner should kindly contact the undersigned attorney for a telephone interview.

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